

WHAT IS CLAIMED IS:

1. An ink jet printer comprising:
at least one ink chamber;
a print head having a plurality of ink jet
nozzles and being connected to said ink chamber;
5 a print controller for driving said print head
in order to print; and
a capping device for covering said ink jet
nozzles of said print head, said capping device
comprising:
10 a cap component having a plurality of
cavities for sorting said ink jet nozzles into a
plurality of nozzle groups by ink chamber unit,
thereby capping all ink jet nozzles corresponding to
at least one ink chamber by nozzle group unit;
15 a pipe being connected to said cavities of
said cap component for supplying negative pressure
to said cavities; and
a suction controller for controlling the
supply of the negative pressure through said pipe to
20 said cavities, thereby supplying the negative
pressure independently by every cavity, whereby said

suction controller sucks the ink from said ink jet nozzles independently by the nozzle group unit.

2. An ink jet printer according to claim 1, wherein said suction controller supplies the negative pressure to one
5 arbitrary cavity of said cap component so as to suck the ink from said ink jet nozzles independently by the nozzle group unit,
and all remaining cavities which correspond to one common ink chamber with said arbitrary cavity are
10 sealed.

3. An ink jet printer according to claim 1, wherein said suction controller supplies the negative pressure to all said cavities corresponding to one common ink chamber simultaneously.

4. An ink jet printer according to claim 1, wherein a plurality of said ink chambers are provided in said printer, and said cap component has
5 of said ink jet nozzles connected to all ink chambers.

5. An ink jet printer according to claim 4,
wherein said cap component comprises one of an
integral unit and a plurality of sub-units divided
according to the nozzle groups sorted by the ink
5 chamber unit.

6. An ink jet printer according to claim 1,
wherein a plurality of said ink chambers are
provided in said printer, and said cap component
does not have a dimension and number of cavities for
5 capping all of said ink jet nozzles connected to all
ink chambers, and said ink jet printer further
comprising a second
cap component capping all of said ink jet nozzles at
a stretch.

7. An ink jet printer according to claim 1,
wherein a plurality of said nozzle groups are
arranged in a recording medium transporting
direction.

8. An ink jet printer according to claim 1,
wherein said suction controller receives clogged
nozzle information indicative of a location of a

clogged nozzle, and controls the supply of the
5 negative pressure in accordance with said clogged
nozzle information.

9. An ink jet printer according to claim 8, wherein said clogged nozzle information includes information indicative of said ink chamber connected to the clogged nozzle, number of clogged nozzles, and a location of the clogged nozzle on said print head.

10. An ink jet printer according to claim 8, wherein said suction controller includes a selection table containing a plural number of control guidances corresponding to a variety of said clogged nozzle information, and controls the supply of the negative pressure in accordance with a specific control guidance, which correspond to said clogged nozzle information, selected from said selection table.

11. An ink jet printer according to claim 8, wherein said suction controller selects one of a selective suction mode and an all-nozzle suction mode in accordance with said clogged nozzle.

5 information received, and when said selective
suction mode is selected, said suction controller
sucks the ink from at least one nozzle group
selected from a plurality of nozzle groups, and when
the all-nozzle suction mode is selected, said
10 suction controller simultaneously sucks ink from all
of said nozzle groups.

12. An ink jet printer according to claim 8,
wherein said print controller includes a check
pattern print portion for printing a predetermined
clogging check pattern used for detecting a clogged
5 nozzle by driving said print head.

13. An ink jet printer according to claim 12,
further comprising a pattern reading device for
reading said printed clogging check pattern to
locate a clogged nozzle so as to send the resultant
5 clogged nozzle information to said suction
controller.

14. An ink jet printer according to claim 8,
further comprising an input device, operated by a
user, for entering the clogged nozzle information to
said ink jet printer.

15. An ink jet printer according to claim 8,
wherein said ink jet printer is connected to a host
controlling device located outside of said ink jet
printer, and said suction controller receives the
5 clogged nozzle information from said host
controlling device.

16. An ink jet printer according to claim 1,
wherein said suction controller receives information
designating one of a specific nozzle group and a
specific cavity, and supplies the negative pressure
5 to one of a cavity associated with said specific
nozzle group and said specific cavity in accordance
with said designating information.

17. An ink jet printer according to claim 1,
wherein said ink jet printer is connected to a host
controlling device located outside of said ink jet
printer, and said suction controller receives said
5 designating information from said host controlling
device.

18. A printing system comprising:

1) an ink jet printer comprising:

at least one ink chamber;

a print head having a plurality of ink jet
5 nozzles and being connected to said ink chamber;

a print controller for driving said print
head in order to print; and

a capping device for covering said ink jet
nozzles of said print head, said capping device
10 comprising:

a cap component having a plurality of
cavities for sorting said ink jet nozzles into a
plurality of nozzle groups by ink chamber unit,
thereby capping all ink jet nozzles corresponding to
15 at least one ink chamber by nozzle group unit;

at least one pipe being connected to
said cavities of said cap component for supplying
negative pressure to said cavities; and

a suction controller for controlling
20 the supply of the negative pressure through said
pipe to said cavities, thereby supplying the
negative pressure independently by every cavity,
whereby said suction controller sucks the ink from
said ink jet nozzles independently by the nozzle
25 group unit; and

2). a host controlling device for controlling
said ink jet printer, said host controlling device
sending to said ink jet printer selection
information necessary for selecting one nozzle group
30 to be sucked with the ink therefrom.

19. A printing system according to claim 18,
wherein said host controlling device comprises:

a commanding portion for commanding said ink
jet printer to print a predetermined clogging check
5 pattern;

user input means by which a user enters user
input information indicative of clogged nozzle
information; and

a selection information generator for
10 generating said selection information based on said
user input information entered by said user input
means.

20. A printing system according to claim 18,
wherein said user interface displays a clogging
check pattern image on a user interface screen of
said host controlling device, and the user enters
5 said user input information by pointing a location

on said displayed clogging check pattern image,
which corresponds to a location of the clogged
nozzle.

21. A data storing medium, accessible by a
computer, storing a program for executing a process
to detect a defective dot forming element in dot
forming elements in a printer, wherein said process
5 comprising the steps of:

instructing said printer to print a
predetermined clogging check pattern;

displaying a clogging check pattern image on a
user interface screen of said computer; and

10 specifying said defective dot forming element
in a manner that a user points to a location in said
displayed clogging check pattern image, which
corresponds to said defective dot forming element.

22. A data storing medium, accessible by a
computer, storing a program for executing a process
to instruct an ink jet printer having a plurality of
ink jet nozzles to clean said ink jet nozzles,

5 wherein said ink jet printer selectively performs one of an ink saving cleaning process and a normal cleaning process,

wherein said ink saving cleaning process is executed through a selective suction operation to
10 suck ink from only at least one ink jet nozzle selected from said ink jet nozzles, and said normal cleaning process is executed through a all-nozzle suction operation for simultaneously sucking the ink from all of said ink jet nozzles at any time; and

15 said cleaning instruction process comprising the steps of:

displaying an image requesting a user to select one of a saving mode corresponding to said ink saving cleaning process and a normal mode
20 corresponding to said normal cleaning process on a user interface screen of said computer;

instructing said ink jet printer to execute said ink saving cleaning process when the user selects said saving mode selected on the image
25 displayed on the user interface screen; and

instructing said ink jet printer to execute said normal cleaning process when the user selects

said normal mode selected on the image displayed on the user interface screen.

23. A method for controlling an ink jet printer comprising a print head having a plurality of ink jet nozzles sorted into a plurality of nozzle groups, and a capping device for selectively sucking
5 ink from said nozzle groups by selectively capping said nozzle groups, said method comprising the steps of:

printing a predetermined clogging check pattern and causing a user to detect a clogged nozzle;

10 visually presenting a clogging check pattern image to the user;

obtaining clogged nozzle information indicative of said clogged nozzle in a manner that the user points to a location in said displayed clogging
15 check pattern image, which corresponds to said clogged nozzle in said printed clogging check pattern;

selecting one nozzle group from said nozzle groups based on said clogged nozzle information
20 obtained; and

sucking the ink from said clogged nozzle in
said selected nozzle group.

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24. An ink jet recording apparatus comprising:
a ink jet recording head for discharging ink
droplets through nozzle openings upon receiving ink
supply from an ink cartridge;
- 5 capping means for sealing said recording head
to absorb ink droplets through the nozzle openings;
- a valve unit arranged between said ink
cartridge and said nozzle openings of the recording
head for opening and closing an ink supply path
- 10 between the ink cartridge and the nozzle openings;
and
- valve opening/closing control means for
controlling opening and closing of said valve unit
in accordance with the cleaning operation to absorb
- 15 ink droplets through the nozzle openings, with
sealing the nozzle openings of the recording head
with said capping means.

25. An ink jet recording apparatus comprising:

ink jet recording heads for discharging
different color ink droplets through each nozzle
opening upon receiving ink from the ink cartridges;

5 capping means for sealing each nozzle
opening of said recording head to absorb ink
droplets through the nozzle openings;

10 a plurality of valve units arranged
between said ink cartridges and each nozzle opening
of the recording head for opening and closing the
ink supply paths between the ink cartridges and each
nozzle opening; and

15 valve opening/closing control means for
controlling said valve units to open and close
valves in accordance with the cleaning operation to
absorb ink droplets through the nozzle openings,
with sealing the nozzle openings of the recording
head with said capping means.

26. An ink jet recording apparatus as claimed
in claim 25, wherein said valve opening/closing
control unit can select from several modes, full-
open mode for opening all valve units, full-close
5 mode for closing all valve units, and alternative

open mode for opening only one valve unit alternatively.

27. An ink jet recording apparatus as claimed in claim 26, wherein said each valve unit interlocks with rotational drive of an actuator to select one mode from said full-open mode, full-close mode, and
5 alternative open mode.

28. An ink jet recording apparatus as claimed in claim 25, wherein said valve units are arranged in a black ink supply path, a cyan ink supply path, a magenta ink supply path, and a yellow ink supply
5 path respectively.

29. An ink jet recording apparatus as claimed in claim 24, wherein said valve units are mounted on a carriage together with said ink cartridges and said recording head, and reciprocate along a guide
5 member.

30. An ink jet recording apparatus as claimed in claim 24, wherein head filters are disposed in the ink supply paths between said valve units and said nozzle openings of the recording head.

31. An ink jet recording apparatus as claimed
in claim 24, wherein said valve units are arranged
such that at least a pair of ink connecting holes
penetrate crossing the axis direction of the shaft,
5 disposed across said ink supply paths.

32. An ink jet recording apparatus as claimed
in claim 25, wherein said capping means is formed
with a single capping member capable of sealing all
nozzle openings for discharging different color inks
5 respectively.

Sub 93 > 33. A recording head cleaning method in an ink
jet recording apparatus comprising:

an ink jet recording head for discharging ink
droplets upon receiving ink supply from an ink
5 cartridge;

capping means for sealing said recording head
to absorb ink droplets through nozzle openings; and

a valve unit arranged between said ink
cartridge and said nozzle openings of the recording
10 head for opening and closing the ink supply path
between the ink cartridge and the nozzle openings,

and the recording head cleaning method in an ink jet recording comprising the steps of:

15 sealing the nozzle openings of the recording head with said capping means in a state closing said valve unit and applying negative pressure into the capping means;

20 in said step, with applying negative pressure into the capping means, opening said valve unit to absorb ink from the nozzle openings of the recording head.

34. A recording head cleaning method in an ink jet recording apparatus as claimed in claim 33, executing the steps:

5 closing the valve unit following said ink absorbing step,

10 further closing the valve unit for preventing air bubbles formed with discharged ink within the capping means in said ink absorbing step, from being pulled into the nozzle openings of the recording head.

35. A recording head cleaning method in an ink jet recording apparatus comprising:

an ink jet recording head for discharging
different color ink droplets through (each) nozzle
5 opening upon receiving ink from the ink cartridges;

capping means for sealing each nozzle opening
of said recording head to absorb ink droplets
through the nozzle openings; and

a plurality of valve units arranged between
10 said ink cartridges and each nozzle opening of the
recording head for opening and closing the ink
supply paths between the ink cartridges and each
nozzle openings,

and the recording head cleaning method in an
15 ink jet recording apparatus comprising the steps of:

sealing the nozzle openings of the recording
head with said capping means in a state closing said
valve units and applying negative pressure into the
capping means;

20 in said step, with applying negative pressure
into the capping means, opening said all or a part
of valve units to absorb ink through the nozzle
openings of the recording head.

36. A recording head cleaning method in an ink jet recording apparatus as claimed in claim 35, executing the steps:

5 closing all valve units following said ink absorbing step, further closing valve units for preventing air bubbles formed with discharged ink within the capping means in said ink absorbing step, from being pulled into the nozzle openings of the recording head.